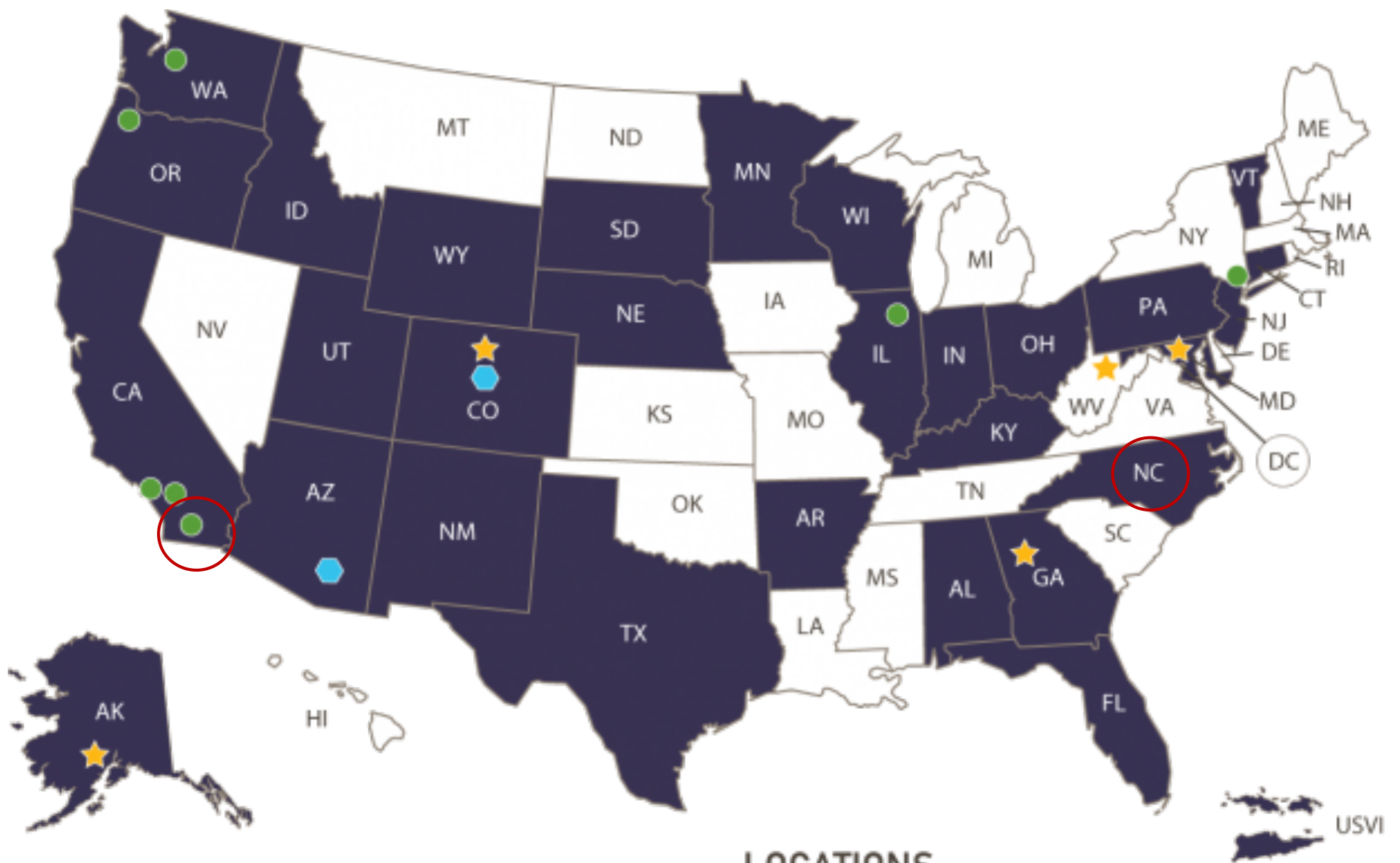


# Public Health in Fair Environments: Environmental and Human Risk Factors



NATHANIEL LEWIS, PHD

EPIDEMIC INTELLIGENCE SERVICE, CDC AND UDOH



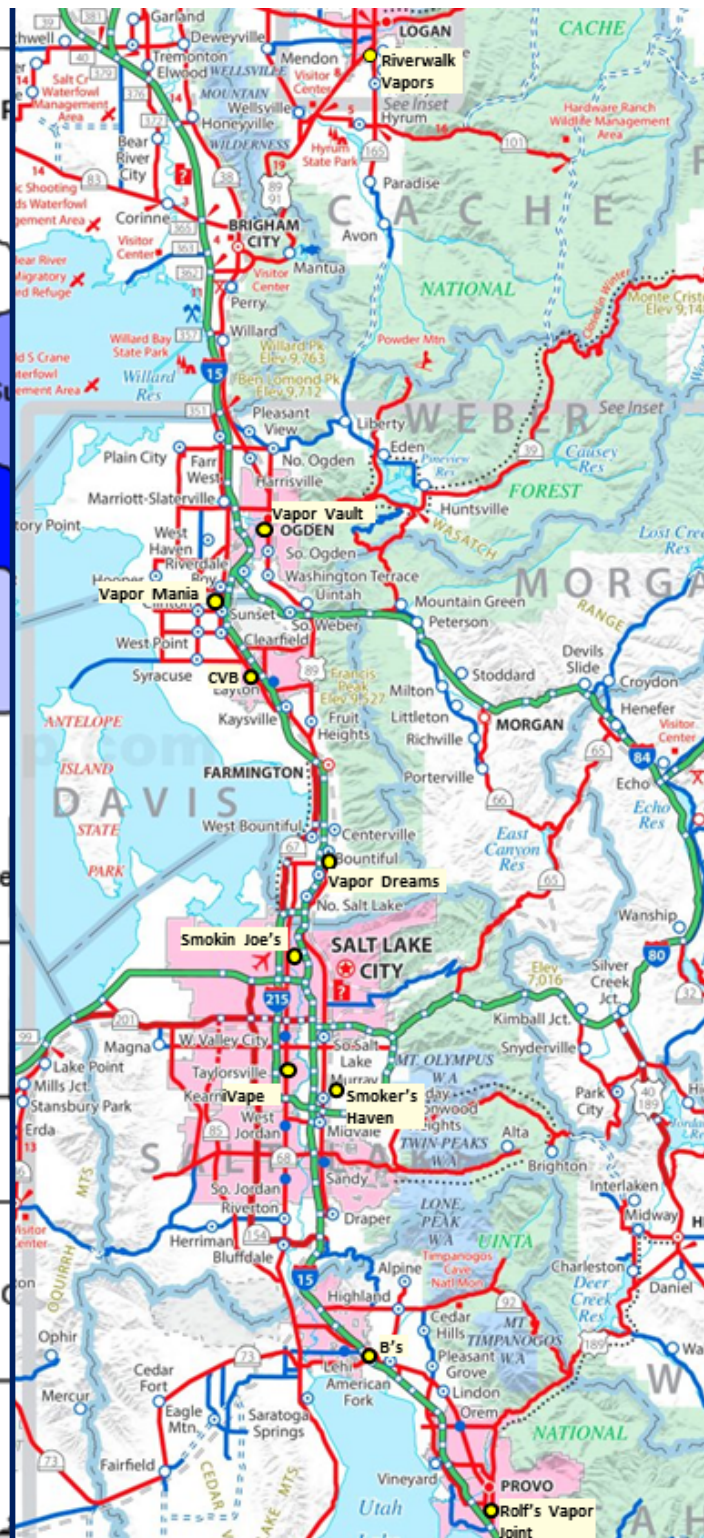
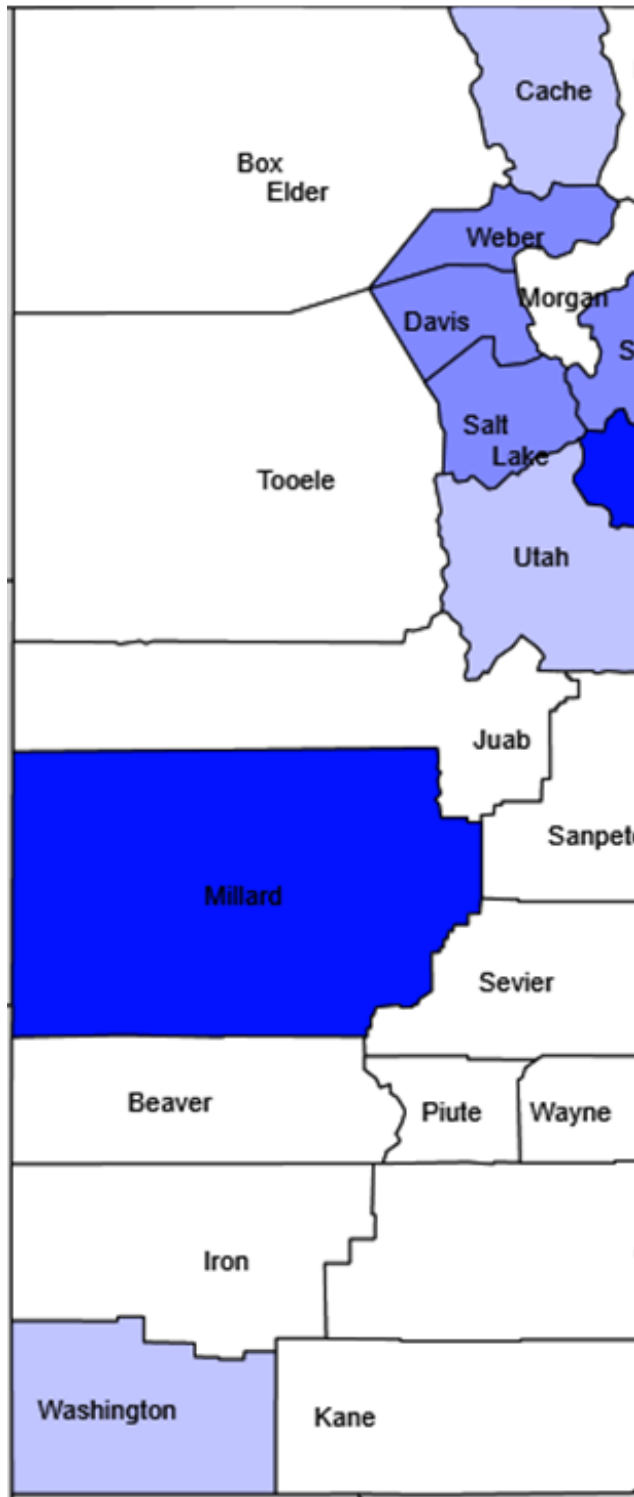
**2018 and 2019 EIS classes (131 officers)**  
65 in class of 2018 | 66 in class of 2019

Effective July 2019

## LOCATIONS

- State or territorial health departments (31 officers)
- City, county, tribal, and other partners (8 officers)
- Combined county & state positions (2 officers)
- CDC headquarters and campuses (90 officers)





per 100,000

Missing / Excluded

Less than 0.01

0.01 to 2

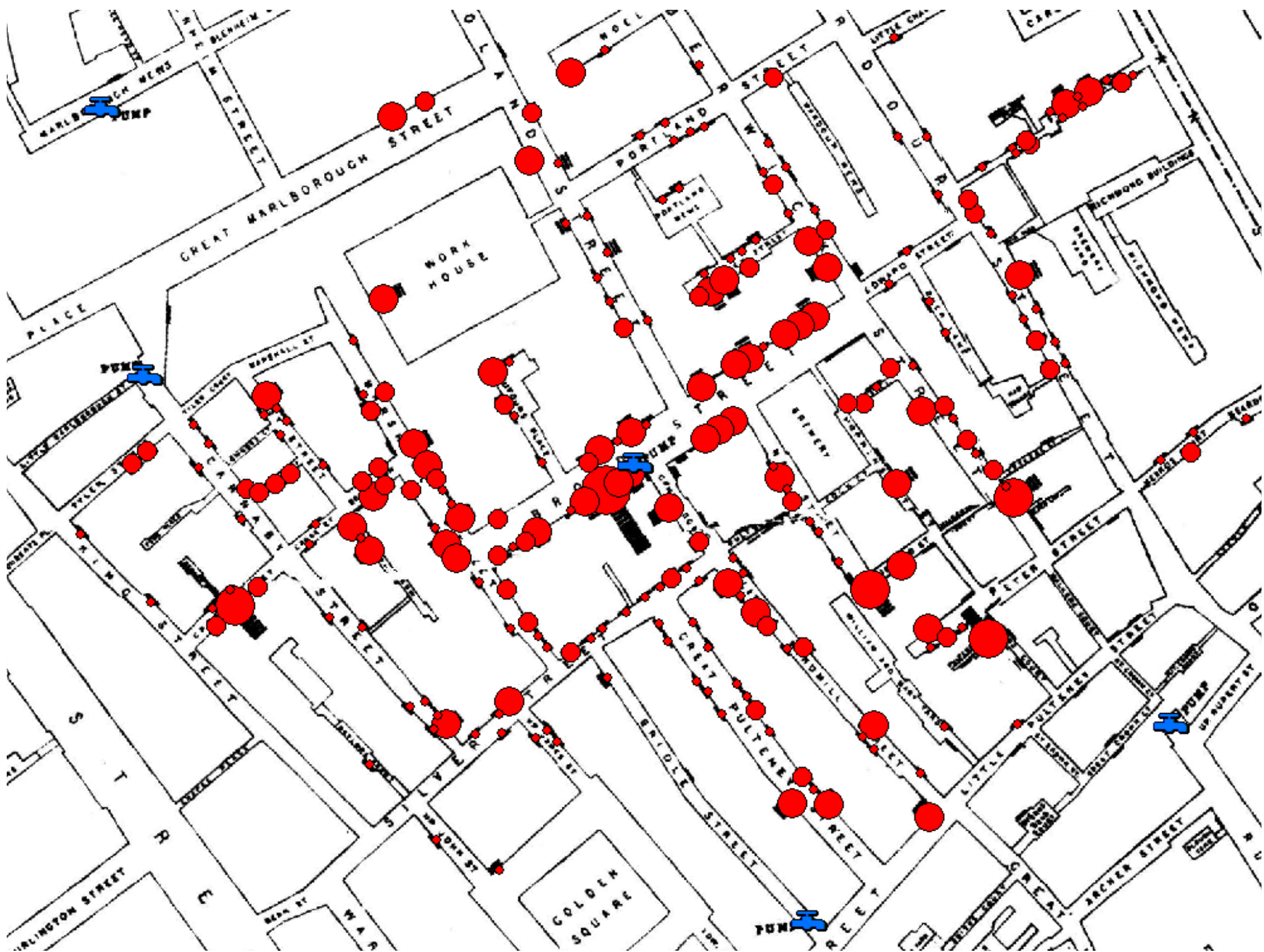
2 to 4

4 to 6

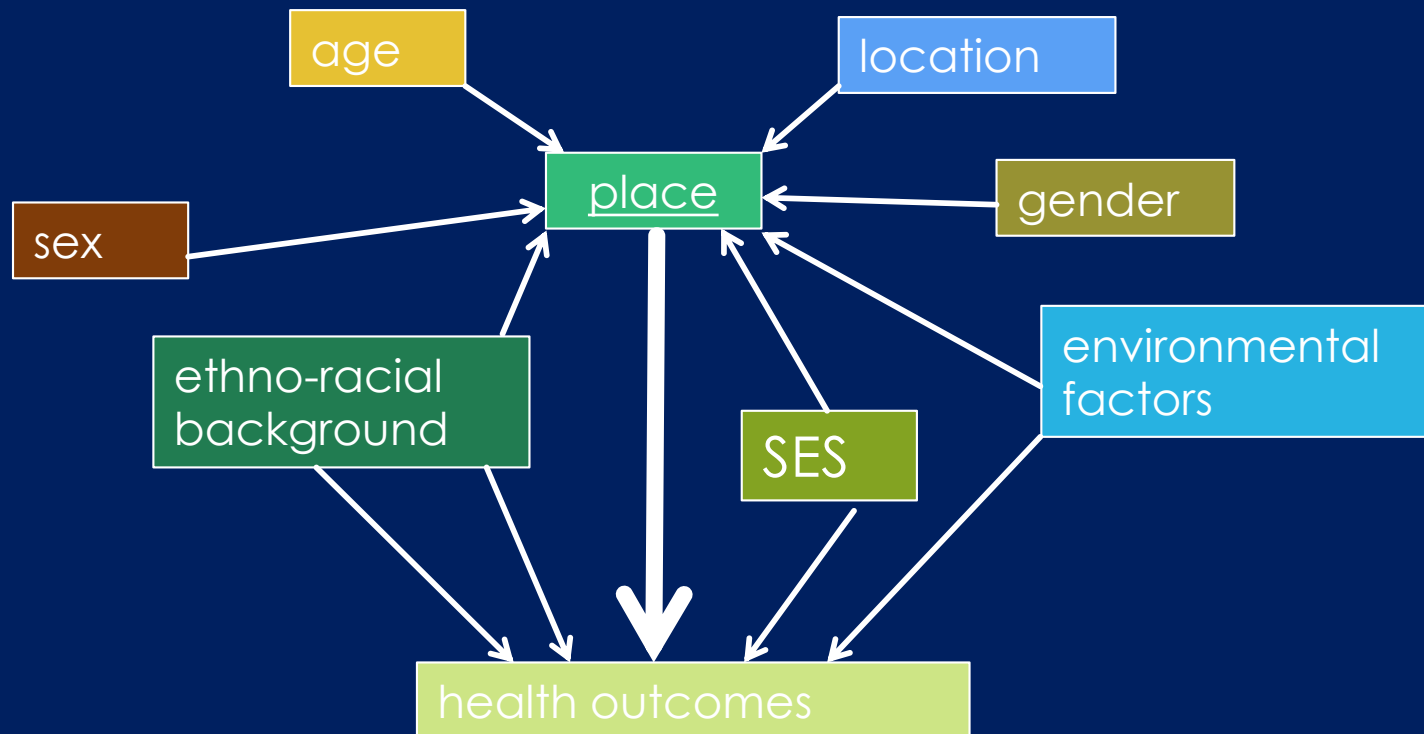
6 and above

0 (San Juan)

15.9961609213789 (Millard)













San Diego County Fair, 2019

More than 1 million attendees annually

4<sup>th</sup> largest county fair in the USA



HEALTH

## Four Cases of E. coli Bacteria Linked to San Diego County Fair



June 24–28, 2019: onset of symptoms among 4 individuals testing positive for shiga-toxin-producing E. Coli (STEC) infection among fair attendees

### SD Health implemented:

- Rapid sero-ID for STEC
- Full-genome sequencing for strain

### 13 total cases by the end of the outbreak:

- 10 confirmed primary
- 1 confirmed secondary
- 2 probable primary
- 80% cases under 15
- Median age: 6
- 4 hospitalizations
- 1 death (2 years old)



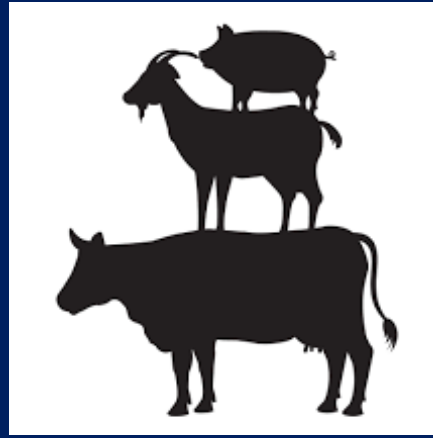
# STEC:

- Produces toxicity in digestive system and blood
- Constantly present in soil
- Main vector is animal feces
- Human transmission through:
  - Live animal contact
  - Animal meat
  - Vegetables
- 3–4 day incubation, 1–2 week infection
- Symptoms: bloody diarrhea, cramps, vomiting, fever, hemolytic uremic syndrome

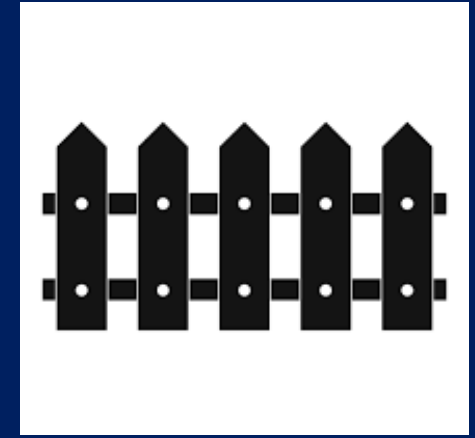




140



48



15

Full genome sequencing of samples from all 13 patients indicated that the STEC infection came from the same bacterial strain

At the time of testing, the only positive environmental specimens were cattle feces (calves at the petting zoo)

STEC over time can appear and disappear on the same sample





- 1<sup>st</sup> big petting zoo-related STEC outbreak (NC, 2004)
- Creation of Aiden's law for exhibits with physical contact between humans and animals
- NC created multi-agency task force and updates
- Recurrence in 2019 signals need for:
- More multilingual risk communication (signage), age limit ( $\geq 2$  years), requirement for attendant at handwashing stations, monitoring contact



# North Carolina Mountain State Fair, 2019

About 200,000 attendees annually





# The number of Legionnaires' disease cases in an outbreak linked to a North Carolina state fair has risen to 25

By Theresa Waldrop, Amanda Watts and Ray Sanchez, CNN

🕒 Updated 4:47 PM ET, Thu September 26, 2019



## More from CNN



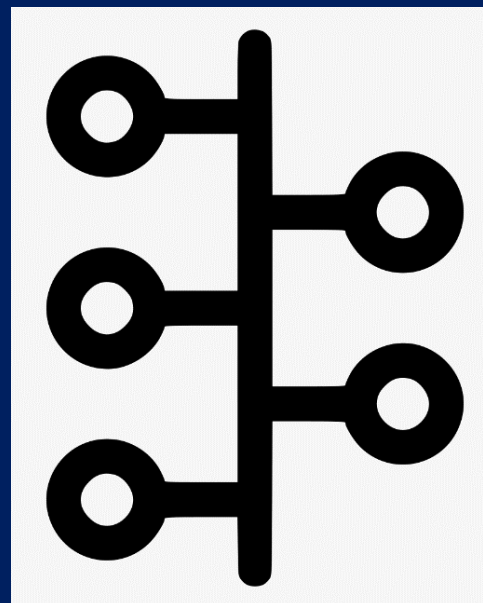
Here's what happened in the minutes before Kobe Bryant's...

Fair: 9/6–9/15, 2019, at the W-NC Agricultural Center

9/23: 14 cases reported across multiple counties

9/25: diagnosis guidance

9/27: Case-control study begins



9/24: Press release

9/25–9/27: site visit

# Legionellosis bacteria:

- Found in fresh water and damp soils at non-harmful levels
- Tends to multiply and aerosolize in man-made environments of 77-107 F, humans breathe it in
- Incubation: usually 5–6 days
- Symptoms: cough, shortness of breath, fever, muscle aches and headaches
- More common in those  $\geq 50$  years, former smokers, and those with respiratory problems





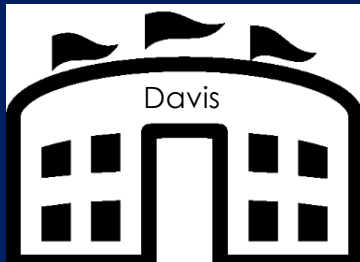


136 total cases reported by the end of September (illness onset 9/13– 9/27)

Environmental sampling only found legionella in a women's restroom, but this was 2 weeks after fair



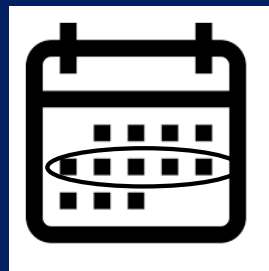
But infected (compared to non-infected) attendees were:



10x more likely



12x more likely




9x more likely

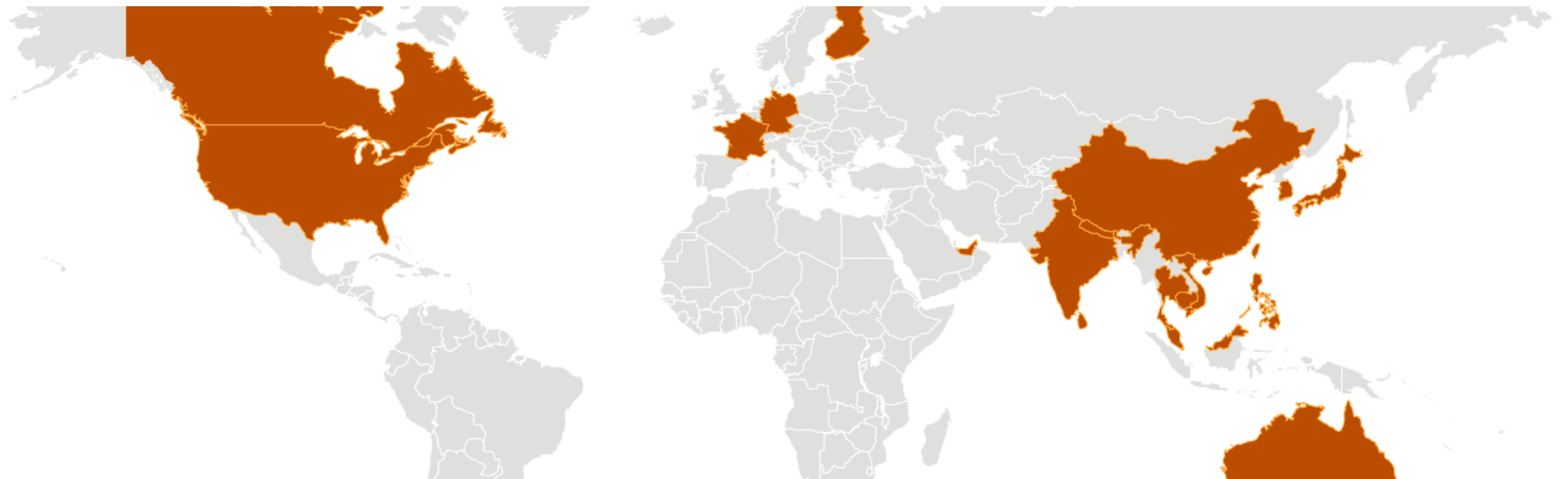


- Median age of patients was 61
- Legionella may have originated from tubs or water supply
- 4 hot tubs had been featured, 3 were running
- Most regulations for hot tub maintenance are for in-use tubs
- But vendors displaying hot tubs need to treat and maintain them as if they are in use

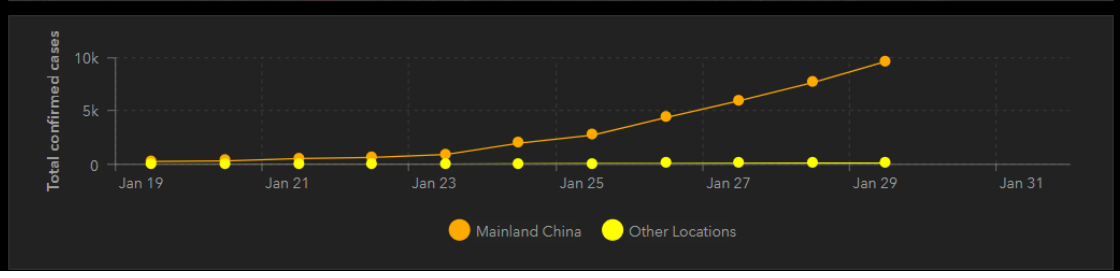
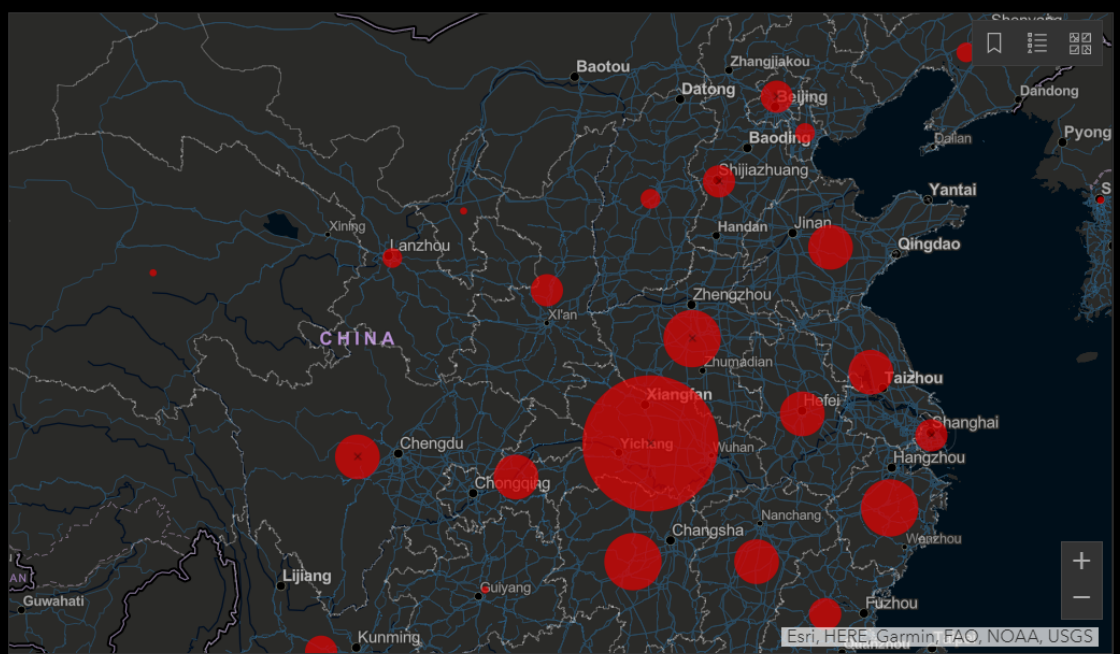




Novel Coronavirus (N-CoV-2019)  
Originating in Wuhan, China  
Over 9,700 infected



Total Confirmed
9,776
Confirmed Cases by Country/Region
9,658 Mainland China
14 Thailand
12 Hong Kong
11 Japan
10 Singapore
9 Australia
9 Taiwan
8 Malaysia
7 Macau
6 South Korea
6 US
5 France
4 Germany
4 United Arab Emirates
3 Canada
2 Italy
2 Vietnam



Total Deaths
213
5,806 confirmed; 204 deaths <b>Hubei</b> Mainland China
537 confirmed; 0 deaths <b>Zhejiang</b> Mainland China
393 confirmed; 0 deaths <b>Guangdong</b> Mainland China
352 confirmed; 2 deaths <b>Henan</b> Mainland China
332 confirmed; 0 deaths <b>Hunan</b> Mainland China
240 confirmed; 0 deaths <b>Jiangxi</b> Mainland China
237 confirmed; 0 deaths <b>Anhui</b> Mainland China

Total Recovered
187
116 recovered <b>Hubei</b> Mainland China
11 recovered <b>Guangdong</b> Mainland China
9 recovered <b>Shanghai</b> Mainland China
9 recovered <b>Zhejiang</b> Mainland China
7 recovered <b>Jiangxi</b> Mainland China
5 recovered <b>Beijing</b> Mainland China
5 recovered Thailand
3 recovered <b>Anhui</b> Mainland China
3 recovered <b>Henan</b> Mainland China
2 recovered <b>New South Wales</b> Australia

Last Update: Jan 30, 2020 9:30 pm EST.  
 Visualization: [JHU CSSE](#).  
 Read more in this [blog](#).  
 Data sources: [WHO](#), [CDC](#), [ECDC](#), [NHC](#) and [DXY](#).  
 Downloadable Google Sheet (support comments): [Here](#).

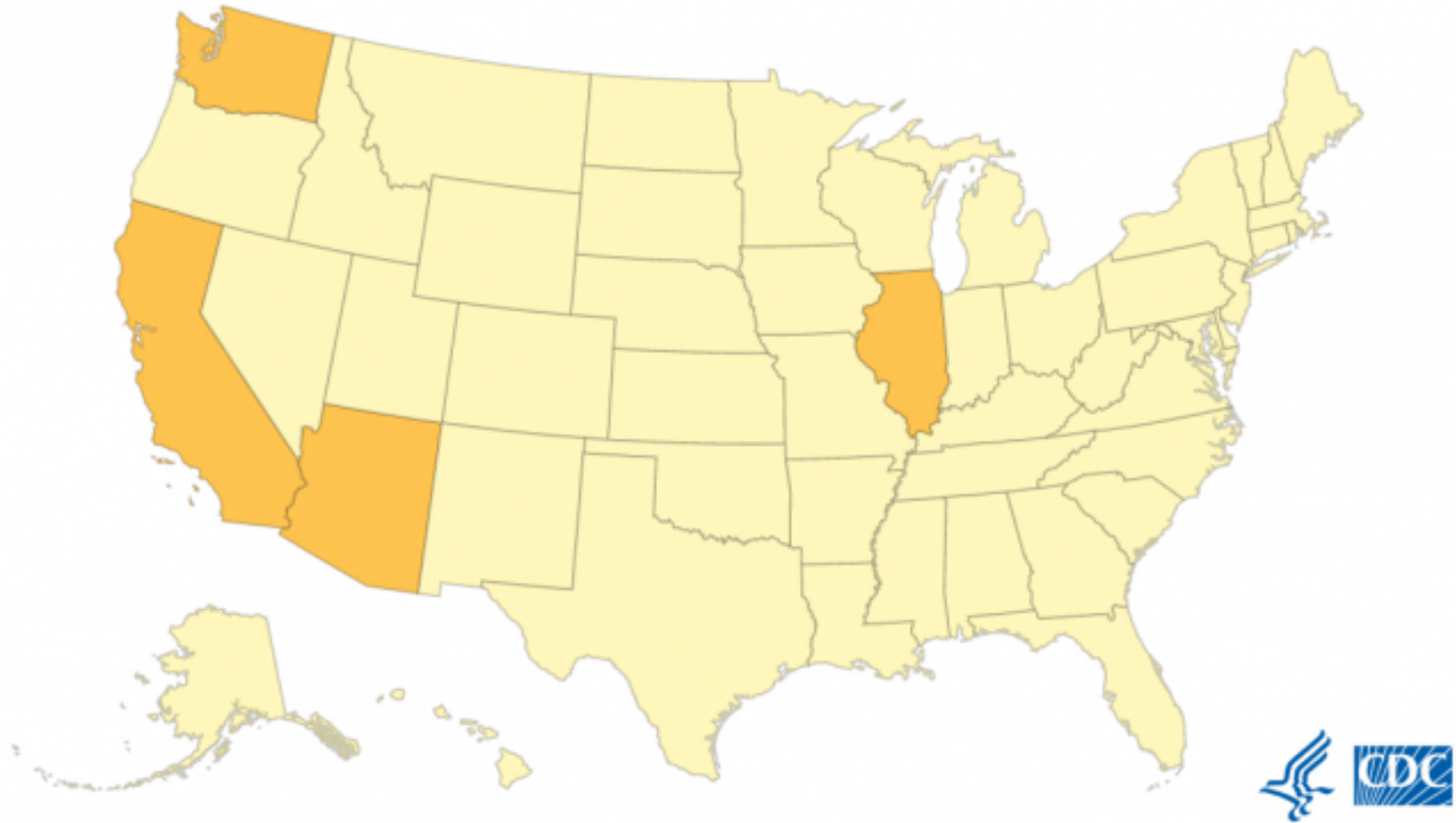


# NCoV-2019:

- Coronaviruses are common (includes common cold)
- This is *new* because it is a previously unseen virus, likely from an animal and mutated enough to enter a human host
- Live animal markets act as reservoirs—prolonged contact, 1<sup>st</sup> case early December 2019
- Incubation 2–14 days
- Symptoms: cough, fever, shortness of breath → pneumonia



## States with confirmed 2019-nCoV cases



- 1<sup>st</sup> human-to-human transmission confirmed in IL yesterday
- Germany has published first case of asymptomatic transmission
- SARS: 8 confirmed cases in USA, *no* human-to-human spread
- Each patient infects about 2 more (avg.), cases double each week



- Utah does not have any confirmed cases.

- 5 categories for surveillance and response:

- *Confirmed case:* isolate and provide supportive care.
- *Patient under investigation (PUI), 1*—has symptoms and traveled to Wuhan during the past 14 days OR has symptoms and had contact with a confirmed case while that case was ill: isolate at home/hospital and actively monitor until test results received
- *Patient under investigation (PUI), 2*—has symptoms and had close contact with another PUI: isolate at home/hospital and actively monitor until test results received
- Asymptomatic contacts of a confirmed case: actively monitor
- Asymptomatic contacts of a PUI: passively monitor

# HEALTH ALERT

There is an outbreak of respiratory illness in  
Wuhan, China linked to a new coronavirus.

If you have been in Wuhan  
in the last two weeks and  
develop a **fever, cough**, or  
have **difficulty breathing**,  
seek medical care right away.

- Call ahead before going to a doctor or emergency room.
- Tell them your symptoms and that you have been to Wuhan, China.

FOR MORE INFORMATION:

UTAH DEPARTMENT OF HEALTH  
1-888-EPI-UTAH (374-8824)

OR VISIT  
[WWW.CDC.GOV/WUHAN](http://WWW.CDC.GOV/WUHAN)





## HEALTH ALERT: *Travelers from Wuhan, China*

There is an outbreak of pneumonia in Wuhan, China caused by a new type of coronavirus.

If you have been in Wuhan within the past 2 weeks and develop a fever, cough, or have difficulty breathing, seek medical care right away.

- CALL AHEAD BEFORE GOING TO SEE A DOCTOR OR EMERGENCY ROOM.
- TELL THEM YOUR SYMPTOMS AND THAT YOU WERE IN WUHAN.
- GIVE THEM THIS CARD.

FOR MORE INFORMATION:  
CONTACT THE UTAH  
DEPARTMENT OF HEALTH  
1-888-EPI-UTAH (374-8824)

### Triage Staff/Clinicians:

- Use standard, contact, and airborne precautions, and eye protection.
- Notify infection control and your state/local health department immediately.

For more information: [www.cdc.gov/wuhan](http://www.cdc.gov/wuhan)

CS114423-D



## 健康预警：来自中国武汉的旅客请注意

近期，在中国武汉爆发了一种由新型冠状病毒所引起的肺炎。

如果您在过去两周内曾到过武汉，并出现发烧，咳嗽，或呼吸困难的症状，请立即与医生联系。

- 请在看医生或去急诊室之前打电话咨询。
- 告知医生您的症状，并让医生知道您曾到过武汉。
- 请把此卡片交给医生。

### 分诊人员/临床医生：

- 请采取标准预防，接触隔离，空气传播预防，以及眼部防护措施。
- 请立即通知传染病防控机构和您所在州/地方的卫生部门。

详细信息请参见：[www.cdc.gov/wuhan](http://www.cdc.gov/wuhan)

CS114423-D



- Over 50 community groups, agencies, and key individuals contacted
- Presentation to Asian Association of Utah
- Continue to answer calls daily at UDOH
- Lunar New Year
- Creating guidelines for monitoring, contact tracing, and transport of patients

# Thank you

Special thanks to:

Katy Donovan, CDC EIS, North Carolina Division of Public Health

Megan Chuey, CDC EIS, San Diego County Public Health Services

Kenny Davis, Texas Department of State Health Services  
(formerly Utah Department of Health)

